

REVISIONARY STUDY OF *LASIARRHENUM* (BORAGINACEAE)

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ABSTRACT

Lasiarrhenum, regarded by I.M. Johnston (1954) as monotypic, is treated as having three species: *L. trinervium* (Lehm.) B.L. Turner, *comb. nov.* [an earlier name for *L. strigosum* (H.B.K.) I.M. Johnst., the generitype]; *L. pinetorum* I.M. Johnst. (upon which Johnston erected the monotypic genus *Perittostema* I.M. Johnst.); and *L. confundum* B.L. Turner, *sp. nov.*, a localized endemic from southwestern Durango, México. Since the latter species possesses characters which bridge the "morphological gap" between *Lasiarrhenum* and *Perittostema*, I have reunited the two genera, much as Johnston originally treated these. Distributional maps, key to species, and complete synonymy are given for the taxa concerned.

KEY WORDS: Boraginaceae, *Lasiarrhenum*, *Perittostema*, México

The genus *Lasiarrhenum* was erected as monotypic by Johnston in 1924, and maintained by him in his subsequent account of the Mexican borages (Johnston 1954). Since he rendered an excellent description of the single species involved, such is not repeated here, but I have emended the generic description of *Lasiarrhenum* to include *L. pinetorum* (which Johnston described in 1935 but subsequently created for this the monotypic genus *Perittostema*) and *L. confundum*, described herein.

Johnston (1954) summarized his views on relationships among genera of the tribe Lithospermae for North America. In this, *Lasiarrhenum* and *Perittostema* were positioned near the genera *Lithospermum*, *Macromeria*, and *Onosmodium*. My taxonomic interest in the latter two genera prompted the present study.

LASIARRHENUM I.M. Johnst., emended.*Perittostema* I.M. Johnst.

The genus remains essentially as described in detail by Johnston (1954) except that the following emendations seem in order: corollas 10-25 mm long; stamens may have ligulate or short trianguliform filaments; anthers either pubescent or glabrous on their dorsal surfaces; thecae of anthers yellow or dark-colored with thick ovate to truncate appendages, the connectives with or without a terminal mucro.

Type species, *Lasiarrhenum trinervium* (Lehm.) B.L. Turner [= *L. strigosum* (H.B.K.) I.M. Johnst.].

KEY TO SPECIES

1. Anthers densely pubescent dorsally. 1. *L. trinervium*
1. Anthers glabrous dorsally. (2)
 2. Filaments ca. 1 mm long, trianguliform; corollas ca. 10 mm long. .
..... 2. *L. pinetorum*
 2. Filaments 3-4 mm long, ligulate; corollas ca. 20 mm long.
..... 3. *L. confundum*

1. **LASIARRHENUM TRINERVIUM** (Lehm.) B.L. Turner, *comb. nov.*
 BASIONYM: *Onosma trinervium* Lehm., *Asperif.* 2:37. 1818 (Sep-Oct).
 TYPE: MEXICO. "Habitat in America Meridionali", w/o collector,
 w/o date, but probably based upon Humboldt and Bonpland collections
 from Michoacán in 1803, noted below (type material is said by Stafleu
 & Cowan [1979] to probably reside at Melbourne, Australia, but D.B.
 Foreman [pers. comm.] at MEL could not verify this).

Onosma strigosum H.B.K., *Nov. Gen. & Sp.* 3:93. 1819 (8 Feb). *Onosmodium strigosum* (H.B.K.) Don, *Gen. Syst.* 4:317. 1837. *Lasiarrhenum strigosum* (H.B.K.) I.M. Johnst., *Contr. Gray Herb.* 70:15. 1924. TYPE: MEXICO. Michoacán: vicinity of Patzcuaro, Sep 1803, *Humboldt & Bonpland s.n.* (HOLOTYPE: P).

Lithospermum longifolium Willd. in Roem. & Schultes, *Syst.* 4:742. 1819. TYPE: MEXICO. probably based upon same type as *Onosma strigosum* H.B.K. (HOLOTYPE: P?; Probable isotype: F!).

Onosmodium eriocaulon A.DC., *Prodr.* 10:70. 1846. TYPE: MEXICO. Morelos (?): "Cordillera de Guchilaque", w/o date, J.L. Berlandier 1020 (HOLOTYPE: P; Holotype fragment: GH!; Phototypes: CAS-DS!,F!,MICH!).

Lasiarrhenum lundellii I.M. Johnst., *Wrightia* 2:15. 1959. TYPE: MEXICO. Oaxaca: Mpio. Tlacolula, mountain side in pine woodlands, above Tejocote, 25 Jul 1943, C.L. Lundell 12296 (HOLOTYPE: LL!; Isotype: MICH!). Consultation of Lundell's field notes (LL) reveals this locality to be near Mitla, Oaxaca, although I could not locate Tejocote on maps available to me.

Johnston (1954) gives a very fine descriptive account of this species, and such is not repeated here. Unfortunately he took up the name *Lasiarrhenum strigosum* in ignorance of the chronology. The earliest available name, *Onosma trinervium* Lehm., predates *O. strigosum* H.B.K. by several months, according to publication data presented by Stafleu & Cowan (1979).

Lasiarrhenum lundellii was said by Johnston to differ from *L. strigosum* [= *L. trinervium*] in having a lower habit with fewer-flowered racemes and obovoid corollas, the latter lacking a well defined throat and tube. He further notes that *L. lundellii* has a broadly obconic stigma which is obscurely bilobed. I find these to be highly variable characters throughout the range of *L. trinervium*. Type material of *L. lundellii* does appear to have a softer more uniform vestiture than occurs in most specimens of *L. trinervium*, but overall the specimens concerned seem only weakly differentiated from the latter and scarcely worth taxonomic recognition.

Lasiarrhenum trinervium is a widespread relatively homogeneous species notable for its broad, fleshy ligulate filaments, and markedly appendaged anthers which are abundantly white-hairy on the back. In habit and corolla shape it superficially resembles a species of *Onosmodium*, but Johnston thought its closest relationship to be with *Nomosa*, reasons for which he expounded upon in some detail. It should prove interesting to check his presumably phyletically oriented views with DNA data.

REPRESENTATIVE SPECIMENS: MEXICO. Hidalgo: *Rzedowski 33425* (CAS,MEXU); *West G-9* (WIS). Jalisco: *Anderson 5137* (MICH,NY); *Fuentes 605* (MO); *McVaugh 13049, 13523* (GH,MICH); *Palmer 173* (GM,MEXU, MO,NY,PH,US). México: *Hinton 1533* (GH,MO,NY); *Hinton 5064* (GH, NY,US); *Hinton 8274* (F,GH,LL,MO,NY); *Lundell 12647* (LL,MICH); *Mezía 2710* (CAS,MICH,MO,NY,PH,WIS). Michoacán: *Hinton 15435* (CAS-DS,F, GH,MICH,NY,US); *Leavenworth 545* (F,GH,NY); *Leavenworth 317* (F,MO); *Pringle 4131* (F,GH,MO,NY,US). Morelos: *Fearing 128* (TEX,US); *Hinton 17513* (F,MICH,MO,TEX); *Lyonnnet 1848* (CAS,MEXU,US); *Pringle 9124* (F,GH,MEXU,MO,US). Nayarit: *Pennell 19980* (GH,MICH,NY). Oaxaca:

Ghiesbreght s.n. (GH); *Orcutt s.n.* (MO). Puebla: *Roe 345* (NY,WIS); *Weaver 983* (GH,US). Veracruz: *Nevling 1974* (F,MEXU,NY).

The two collections cited from Oaxaca are fairly typical in appearance, in spite of their relative isolation from the main body of collections.

2. *LASIARRHENUM PINETORUM* I.M. Johnst., J. Arnold Arb. 16:187. 1935. *Perittostema pinetorum* (I.M. Johnst.) I.M. Johnst., J. Arnold Arb. 35:30. 1954. TYPE: MEXICO. Oaxaca: w/o specific locality, Sep 1841(?), *Ghiesbreght 311* (HOLOTYPE: P).

I have not examined material of this taxon. As noted by Johnston (1954), the species is known only by a single specimen with only two mature corollas. Nevertheless, he provided a very detailed thorough description and this need not be repeated here. I have guessed that its type locality (Figure 1) might be near Yavesia, Oaxaca, where Ghiesbreght was known to have collected in the period concerned.

3. *LASIARRHENUM CONFUNDUM* B.L. Turner, *sp. nov.* TYPE: MEXICO. Durango: Mpio. de El Salto, SE face of El Espinozo del Diablo, 20 km SE of La Ciudad, 2770 m, 12 Sep 1979, *D.E. Breedlove 43946* (HOLOTYPE: CAS!).

Lasiarrheno pinetoro I.M. Johnston similis sed staminibus filamentis ligulatis (vs. filamentis triangularibus), corollis longioribus (ca. 20 mm longis vs. 10 mm), et foliis ellipticis plerumque 20-35 mm latisque (vs. lineari-subulatis 1-2 mm latisque) differt.

Erect perennial herbs 35-65 cm high. Stems pubescent with pilose appressed or spreading hairs 1-3 mm long. Midstem leaves elliptical to elliptic-oblong, sessile, 6-8 cm long, 2.0-3.5 cm wide, sparsely pubescent with both minute strigose and appressed long-pilose hairs, pinnately nervate in the manner of *Cornus*. Flowers arranged in 1-3 terminal bracteate secund racemes 3-15 cm long (from first anthesis into late fruiting stages), the pedicels ca. 2 mm long in flower, in fruit 3-11 mm long. Calyces 7-9 mm long, the lobes linear-lanceolate, ca. 1 mm wide. Corollas "white with greenish tip", ca. 20 mm long, appressed pilose without, glabrous within, except for a very sparse array of minute glandular hairs in the area where faucal appendages usually occur, although the latter scarcely obvious in the present species; lobes broadly rounded, 2.5-3.0 mm wide, ca. 1.5 mm long, glabrous within, strigose without. Stamens about equally attached 7-8 mm below the base of the lobes; filaments ligulate, glabrous, 3-4 mm long, 0.8-1.0 mm wide, attached 1-2 mm below midpoint of the connective at ca. 1/3 the staminal length; anthers ca.

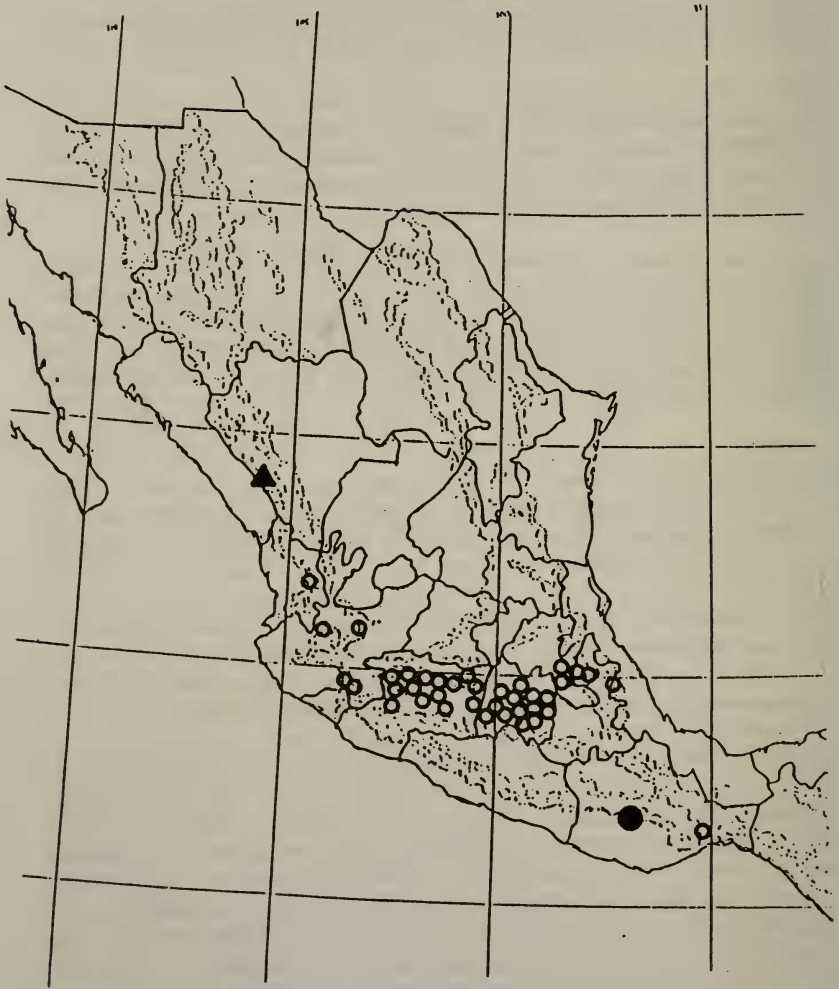


Figure 1. Distribution of *Lasiarrhenum trinervium* (open circles), *L. pinetorum* (closed circle), and *L. confundum* (triangle).

3 mm long, the terminal appendage truncate, ca. 0.25 mm long, terminated by an abrupt mucro ca. 0.1 mm long, at maturity the thecae of lower portion of the anthers separating so as to give the anther a sagittate appearance, the anthers extending to or near the base of the corolla lobes but not exerted. Style glabrous, exerted for 3-10 mm beyond the corollas, the apices bifid, forming two flabellate stigmatic arms ca. 0.25 mm long, 0.4 mm wide. Nutlets off-white, glossy, ca. 3 mm long, 2 mm wide, with a weak ventral ridge.

As indicated by its name, this taxon has confounded my ability to position it as to genus. It superficially resembles a species of *Macromeria* or *Onosmodium* but has markedly different stamens from either of these. In Johnston's (1954) key to the genera of the Lithospermae, the species will begrudgingly key to *Perittostema* (assuming the "throat of corolla [to be] decorated with appendages, stipitate glands or abundant hairs"), but the faucal appendages are weakly developed, if at all, and the leaves have well-developed nerves. Johnston in his description of *Perittostema*, which is based upon a single sheet at P with only two flowers collected by *Ghiesbreght* somewhere in southern México, noted that "The filaments of *Perittostema* are unique [among the Lithospermae]." He went on to describe the very short firm trianguliform filaments in some detail, followed by an account of the anthers. While the filament description does not match that of the presently described species, most other characters appear reasonably close, except for the "dark-colored" thecae margins and recurved mucro. Johnston noted that "The only member of Lithospermae with filaments even suggestive of those of *Perittostema* is the genus *Lasiarrhenum*. In the latter genus the filaments are compressed and are broadened upward, but are much larger and more elongate, being oblanceolate rather than triangular." The presently described taxon has the filaments of *Lasiarrhenum* but the anthers of *Perittostema* (the dorsal surface of anthers of *Lasiarrhenum* being markedly pubescent throughout, including its well developed apical appendage, vs. glabrous in *Perittostema*). In short, *L. confundum* has the filaments of *Lasiarrhenum* but anthers of *Perittostema*, effectively vitiating any strong distinction between these two genera. Because of this I position *Perittostema pinetorum* in the genus *Lasiarrhenum*, as originally done by Johnston.

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LITERATURE CITED

- Johnston, I.M. 1954. Studies in the Boraginaceae. XXVI. Further reevaluations of the genera of the Lithospermae. *J. Arnold Arb.* 35:1-81.
- Stafleu, F. & R. Cowan. 1979. *Taxonomic Literature*, ed. 2, 2:820.